

## COMMENTS ON BIRDS AND CODLING MOTH CONTROL IN THE OZARKS

BY JOHNSON A. NEFF

FOR nearly fifty years my parents have engaged in the growing of fruit, largely apples, in the southwest Missouri Ozarks. Thirty years of my life have been spent there in the orchards of the family ranch, with time out for the realization of a graduate degree in horticulture and entomology. Initiated into the pleasures of bird study at a very early age, few opportunities were ever passed by; we were never too busy to stop work to watch the birds that were so abundant in the orchards. And the last ten years, spent in the employ of the U.S. Fish and Wildlife Service, have permitted a wider scope of observation, extending through many States.

The codling moth (*Cydia pomonella*) has long been known as a leading pest of the apple, causing severe losses. In that portion of the Ozarks where I grew up this insect, although long present, was of minor importance until about 1915. During the decade 1915 to 1925 the codling moth became increasingly abundant, and despite the use of every modern method of control, since 1925 has been a devastating pest of most of the Mid-West apple-growing districts.

The eggs of the codling moth are laid on twigs, leaves, or small fruits in the spring. Upon hatching the tiny worms enter the fruits and reach maturity there. Then they leave the fruits, and crawling down the branches they search for secluded niches in the crotches, under bark scales, in the rubbish on the ground, and even under the surface of the soil in any location offering darkened seclusion. Here they spin cocoons, pupate, and finally emerge as adults. Depending upon season and climate, two to four broods per summer may develop; the last remains in the larval stage, hibernating in the cocoon over winter, pupating in the early spring, and emerging as adults about the time the young fruits begin to form.

Among the cultural methods commonly utilized in combating this pest, is the banding of the main trunk and major scaffold branches. With specially designed scrapers the trees are denuded of loose bark. Bands of burlap, red building paper, special chemically treated paper, or even in some instances several thicknesses of newspaper, are placed about the trunk and branches, thus affording a location where mature worms may find protection for hibernation.

The bands are inspected regularly throughout the summer and the larvae or pupae found hibernating under them are killed and the bands replaced upon the trees. In some regions, in addition to bands, it has been found that tightly wadded pieces of newspaper jammed into the major crotches are helpful. These are burned and new wads inserted at each inspection.

Beyond question the leading avian enemies of the codling moth are woodpeckers, chiefly the resident races of the Downy and Hairy Woodpeckers (*Dryobates pubescens* and *D. villosus*). In the Ozarks two decades ago these birds were not abundant in the orchards during summer, but in autumn they moved in from woodland and spent much of the winter hunting codling moth larvae in the orchards. Every scale of bark, every niche and crotch, was inspected time and time again, and the larvae hibernating even under the paper and burlap bands were neatly removed without undue injury to the bands. On several occasions I carefully inspected trees late in the winter which had been severely infested early in the autumn, finding where as many as 300 to 400 larvae had been removed, and frequently failing to find a single remaining worm. Recent visits to the old home ranch indicate that there has been a decided decrease in the number of these birds, probably because of the slow but constant destruction of the small farm woodlots that once furnished ample nesting sites.

During the 'teens and early twenties I maintained in the orchard trees a group of bird boxes, ranging from thirty to more than a hundred. A majority were occupied each year by Bluebirds, and to some extent by titmice and chickadees, and because of the nest-boxes the population of these species was greatly increased about the orchards. When in 1925 the codling moth suddenly reached a serious stage of abundance we found that these nesting boxes and the nesting material therein were favored hibernating spots. During the winter each box could be dismantled, the worms killed, and the old nest destroyed, but this was not possible during the summer nesting season. Consequently the bird-boxes had to go, and with them went the Bluebirds and most of the titmice and chickadees.

This discovery led to examination of other open bird nests found in the apple trees including those of Robins, Brown Thrashers, orioles, and others. The dense construction of the Robin's nest made it a good home for the adaptable apple worm, and on one occasion more than 100 hibernating larvae were taken from a single nest. Now each empty nest is carefully removed from the trees and burned as soon as possible after the birds have left it.

About 1927 we began to find our building-paper bands torn into shreds and often totally freed from the tree, the pieces blown about by the winter winds. This was a new experience, and one that remained unsolved for more than a year. During the next winter season I chanced to pass through an orchard on the morning after a light snowfall. At last the mystery was solved, for Crow tracks led from tree to tree and newly-torn paper bands and parts thereof lay on top of the new snow. Later Crows (*Corvus brachyrhynchos*) were seen actually tearing at the bands. This activity has continued through each winter season since that time. Even the tightly wadded pieces of newspaper are removed from the

crotches of the trees. From the apple culture standpoint this activity of the Crow is not beneficial. It begins in September before the late varieties of apples have been harvested, thus removing the papers before the last of the worms have descended the trunks. At that time the orchardist is very busy and cannot replace the bands until the fruit is picked. By that time the bands or pieces of them are scattered widely over the orchards. Fragments may carry with them some of the worms, for the Crow seems more interested in tearing paper than in searching each piece carefully for the worms it contains. The Crows do eat some of the worms that are exposed to view, but leave others within the paper scraps. Worms so exposed are undoubtedly killed by winter cold or eaten by other birds, but those imbedded in the paper scraps may well survive.

It should be emphasized that the observations here recorded were not in deserted orchards, but in producing ones where modern cultural methods are used as soon as developed. Spraying and other protective practices follow the schedule laid out by a resident state entomologist. Yet under certain favorable climatic conditions, after the best of care, some years as much as 40 per cent to 50 per cent of the apple crop is wormy or defaced by worm "stings" at picking time. With regret we watched the gradual decrease of the Downy and Hairy Woodpeckers in the community as the small farm wood-lots were cut away, for these birds were real benefactors. The cutting of the woodlots has been slow but continued, and no effort has been made to plan for replenishing of the wood supply by farm reforestation. Such a program might one day result in these birds regaining their former numbers.

The use of nest-boxes in the orchard was of course an artificial, man-made attraction, a practice highly recommended by many conservationists. Under the circumstances, however, we were forced to remove them from the orchard for the potential use of the boxes by the codling moth outweighed the benefits received. Bluebirds, although insect feeders, do not appear to feed more than casually on codling moth adults and larvae. Some boxes are still maintained on poles or in trees in pastures at a distance from the fruit trees.

Few fruit growers, even the most radical, would suggest that occupied bird nests in the open fruit trees should be destroyed, although some have learned, as we did, of the hazard of a Robin's nest as a hibernating spot for codling moth larvae. This knowledge dulls somewhat the pleasure that we once obtained from the dense bird population of our orchards. Certainly we must remove and burn every nest as soon as the young desert it.

The band-destroying activity of the Crow adds little to the sum of its already highly publicized economic status, and may well be classed as merely a nuisance activity. Even though the Crows do eat some of the exposed larvae, the effectiveness of our cultural operations would be enhanced if the Crows had not learned to tear away the bands. No matter how much he may like birds, the first endeavor of the farmer is the

earning of a livelihood, and the self-interest of the task demands that to a great extent he consider his own problems before those of others far away. The observations recorded may well raise doubts locally as to the benefits accruing from the presence of certain birds, for many of the species commonly nesting in the orchards of the Ozarks are not highly rated as codling moth destroyers. The observations described illustrate the local contradictions encountered in practical bird economics which may leave even an ardent bird student somewhat at a loss in evaluating the status of his local bird friends.

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BIRDS IN YOUR BACK YARD. By Virginia S. Eifert. Illinois State Museum, Springfield. Popular Science Series No. 2, 1941. 240 pp.; 96 full page plates. \$.60 postpaid. (Stamps not accepted).

Too frequently we speak of certain bird publications as *local*, very much as though the term were, in itself, a derogation. Mrs. Eifert, in her recent volume, is concerned primarily with the birds of Sangamon County, Illinois; in that sense her notes are of local interest, but since the species that she pictures and discusses are not, most of them, local in their distribution her work will have value, and create interest, in an area very much more extensive than a single county or state.

In our familiarity with, and dependence upon, colored plates reproduced from paintings, or kodachrome pictures and slides, we are prone to forget how effective black-and-white may be as a medium for presenting bird portraits or studies. Against a gray background Mrs. Eifert has made excellent use of black-and-white to picture more than one hundred and twenty bird species. Her study of the Redwing (page 177) is particularly effective, and she has made excellent selection and use of plant materials in some of her portraits. Many of her warblers are highly lifelike, and the White-throated and White-crowned Sparrows (page 205), are noteworthy.

Chapters on attracting and feeding birds are included; there is a check-list of the birds of Sangamon County; notes on local bird distribution, and a bird calendar, week-by-week, adds to the value of the publication. Teachers throughout the Central States will find it particularly helpful.

Occasional small lapses, such as departures from the A. O. U. Check-list order (see the warblers in the Sangamon County list) may be noted, but the work as a whole is accurately and artistically done. One wishes that other state museums might be able to place such a volume in the hands of its teachers, school children, and bird students.—Maurice Brooks.